

ENFORCEMENT SAMPLING QA/QC WORK PLAN

BAYONNE BARREL AND DRUM

NEWARK, ESSEX COUNTY, NEW JERSEY

Prepared by

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Date: 4/28/97

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1.0	BACKGROUND	1
2.0	DATA USE OBJECTIVES	1
3.0	QUALITY ASSURANCE OBJECTIVES	1
4.0	APPROACH AND SAMPLING METHODOLOGIES	4
4.1	<u>Sampling Equipment</u>	4
4.2	<u>Sampling Design</u>	4
4.3	<u>Standard Operating Procedures (SOPs)</u>	4
	4.3.1 Sample Documentation	4
	4.3.2 Sampling SOPs	6
	4.3.3 Sample Handling and Shipment	6
4.4	<u>Analytical Methods</u>	6
4.5	<u>Schedule of Activities</u>	6
4.6	<u>Disposal of PPE and Investigation-Derived Wastes</u>	7
5.0	PROJECT ORGANIZATION AND RESPONSIBILITIES	7
6.0	QA REQUIREMENTS	7
7.0	DELIVERABLES	8
8.0	DATA VALIDATION	9
9.0	SYSTEM AUDIT	9
10.0	CORRECTIVE ACTION	9

LIST OF ATTACHMENTS

ATTACHMENT A: Site Map

ATTACHMENT B: Sediment Sampling, EPA/ERT SOP # 2016

ATTACHMENT C: Sampling Equipment Decontamination EPA/ERT SOP # 2006

1.0 BACKGROUND

The Bayonne Barrel and Drum Site (BB&D) is a former drum reconditioning facility occupying approximately 15 acres off Raymond Boulevard in the Ironbound section of Newark, New Jersey (See Figure 1). The facility operated as an unlicensed treatment, storage, and disposal (TSD) facility from the early 1940's until the early 1980's when the company filed for bankruptcy. The site is bordered to the North and West by Routes 1 and 9, to the East by the New Jersey Turnpike and the South by a movie theater.

At the time the facility was operating, drum cleaning operations involved both closed-head and open-head drums. In closed head drum cleaning, chains and caustic solution were used to wash out previous material in the drums. The spent solution drained through an oil-water separator into a 5,000-gallon underground holding/settling tank and was then pumped into a 60,000-gallon aboveground holding/settling tank. The liquid was decanted to the sewer under a permit from the Passaic Valley Sewage Commission. Open-head drums were placed on a conveyor and moved through the furnace/incinerator, which burned materials inside the drums. Residue materials were collected in two subsurface holding/settling tanks adjacent to the incinerator.

The operation produced a large amount of spent cleaning solutions, furnace ash and sludges. Approximately 40,000 pounds of incinerator ash and sludge were reportedly generated monthly. The storage of these wastes, as well as the storage of drums awaiting reconditioning, are believed to have been the chief source of site contamination.

2.0 DATA USE OBJECTIVES

The objective of this enforcement sampling event is to collect sediment from the storm sewers to determine if surface water runoff is a source of off-site contamination migration.

3.0 QUALITY ASSURANCE OBJECTIVES

The overall Quality Assurance (QA) objective for chemical measurement data associated with this sampling event is to provide analytical results that are legally defensible in a court of law. The QA program will incorporate Quality Control (QC) procedures for field sampling, chain of custody, laboratory analyses, and reporting to assure generation of sound analytical results.

The EPA On-Scene-Coordinator (OSC) has specified a Level 2 QA objective (QA-2). Details of this QA level are provided in Section 6.0. The objective of this project/event applies to the following parameters:

Table 1: Quality Assurance Objectives

QA Parameters	Matrix	Intended Use Of Data	QA Objective
Target Compound List (TCL) - Volatiles - Semivolatiles - Polychlorinated Biphenyls (PCBs)	Sediment	Enforcement	QA-2
Target Analyte List (TAL) Metals	Sediment	Enforcement	QA-2
Polychlorinated Dibenzo Dioxins (PCDD) Polychlorinated Dibenzo Furans (PCDF)	Sediment	Enforcement	QA-2

A Field Sampling Summary is attached in Table 2 and a QA/QC Analysis and Objectives Summary is attached in Table 3.

TABLE 2: FIELD SAMPLING SUMMARY

Analytical Parameter	Matrix	Container Size	Preserv.	Holding Time	Subtotal Samples	MS/MSD Samples	Duplicate Samples	Field Samples
TCL Volatile TCL Semivolatiles TCL PCB/Pesticides	Soil/Sediment	1 x 8-oz. WM 1 x 8-oz. WM	NR	10 days 7 days 7 days	3	1	1	5
TAL Metals	Soil/Sediment	1 x 8-oz. WM	NR	180 days*	3	1	1	5
PCDD/PCDF	Soil/Sediment	2 x 8-oz. WM	Cool to 4° C	7 days	3	1	1	5
TCL Volatiles	Aqueous (Rinsate)	2x40ml. Vials	HCl pH <2	10 days	1	NR	NR	1
TCL Semivolatiles	Aqueous (Rinsate)	4x1L. Amber	Cool to 4° C	7 days	1	NR	NR	1
TCL Pesticides/PCBs	Aqueous (Rinsate)	incl. w/Semivolatiles	Cool to 4° C	7 days	-	-	-	-
TAL Metals	Aqueous (Rinsate)	1x1L. Poly	HNO ₃ pH <2	180 days*	1	NR	NR	1

NR - not required

* - TAL Metals Holding Time: 180 days except Mercury - 28 days till extraction

* Rinsate sample only required if non-dedicated stainless steel sampling equipment is used.

TABLE 3: QA/QC Analysis and Objectives Summary

Analytical Parameter	Matrix	Analytical Method Reference	QA/QC Quantitation Limits	QA Objective
Full TCL	Soil/Sediment	CLP SOW OLMO 4.0	As per Method	QA-2
TAL Metals	Soil/Sediment	CLP SOW ILMO 4.0	As per Method	QA-2
PCDD/PCDF	Soil/Sediment	SW 846, 8290	As per Method	QA-2
Full TCL	Aqueous	CLP SOW OLMO 4.0	As per Method	QA-2
TAL Metals	Aqueous	CLP SOW ILMO 4.0	As per Method	QA-2
PCDD/PCDF	Aqueous	SW 846, 8280	As per Method	QA-2

Note: CLP-format deliverables required for all data packages.

4.0 APPROACH AND SAMPLING METHODOLOGIES

4.1 Sampling Equipment

Sediment samples from storm drains will be collected with dedicated trowels attached to an extension device and/or stainless steel augers depending on accessibility. If stainless steel sampling equipment will be used, augers, trowels and bowls will be decontaminated prior to sampling and after each discreet sample is acquired. EPA/ERT SOP #2006 Sampling Equipment Decontamination (Attachment C) will be used. The individual steps of equipment decontamination are as follow:

Decontamination Steps

1. Physical removal of gross contamination,
2. Low-phosphate detergent wash,
3. Potable water rinse,
4. 10% nitric acid rinse (ultra grade),
5. Acetone rinse or methanol, then hexane (pesticide-grade or better) rinse,
6. Thorough final rinse with demonstrated analyte-free deionized water (volume used must be 3-5 times the volume of solvent used in the previous step), and
7. Air dry; wrap in aluminum foil until next use.

4.2 Sampling Design

START will collect up to 3 storm sewer sediment samples with dedicated scoops and submit them for the following laboratory analysis: Full TCL, TAL Metals, and PCDD/PCDF. Sample locations will be determined by the OSC.

QA/QC samples will include the collection of one field duplicate and one matrix spike/matrix spike duplicate sample at a ratio of 1 per 20 samples. Extra sample volume will be submitted to allow the laboratory to perform matrix spike sample analysis. One rinsate sample will be collected per sampling date when non-dedicated stainless steel sampling equipment is used.

This sampling design is based on information currently available and may be modified on site. All deviations from the sampling plan will be noted in the Sampling Trip Report.

4.3 Standard Operating Procedures (SOPs)

4.3.1 Sample Documentation

All sample documents will be completed legibly, in ink. Any corrections or revisions will be made by lining through the incorrect entry and by initialing the error.

FIELD LOGBOOK

The field logbook is essentially a descriptive notebook detailing site activities and observations so that an accurate account of field procedures can be reconstructed in the writer's absence. All entries will be dated and signed by the individuals making the entries, and should include (at a minimum) the following:

1. Site name and project number.
2. Name(s) of personnel on site.
3. Dates and times of all entries (military time preferred).
4. Descriptions of all site activities, site entry and exit times.
5. Noteworthy events and discussions.
6. Weather conditions.
7. Site observations.
8. Sample and sample location identification and description*.
9. Subcontractor information and names of on-site personnel.
10. Date and time of sample collections, along with chain of custody information.
11. Record of photographs.
12. Site sketches.

* The description of the sample location will be noted in such a manner as to allow the reader to reproduce the location in the field at a later date.

SAMPLE LABELS

Sample labels will clearly identify the particular sample, and should include the following:

1. Site/project number;
2. Sample identification number;
3. Sample collection date and time;
4. Designation of sample (grab or composite);
5. Sample preservation;
6. Analytical parameters; and
7. Name of sampler.

Sample labels will be written in indelible ink and securely affixed to the sample container. Tie-on labels can be used if properly secured.

CHAIN OF CUSTODY RECORD

A chain of custody record will be maintained from the time the sample is taken to its final deposition. Every transfer of custody must be noted and signed for, and a copy of this record kept by each individual who has signed. When samples (or groups of samples) are not under direct control of the individual responsible for them, they must be stored in a locked container sealed with a custody seal. Specific information regarding custody of the samples projected to be

collected on the weekend will be noted in the field logbook.

The chain of custody record should include (at minimum) the following:

1. Sample identification number.
2. Sample information.
3. Sample location.
4. Sample date.
5. Name(s) and signature(s) of sampler(s).
6. Signature(s) of any individual(s) with control over samples.

CUSTODY SEALS

Custody seals demonstrate that a sample container has not been tampered with, or opened. The individual in possession of the sample(s) will sign and date the seal, affixing it in such a manner that the container cannot be opened without breaking the seal. The name of this individual, along with a description of the sample packaging, will be noted in the field logbook.

4.3.2 Sampling SOPs

SEDIMENT SAMPLING

Sediment sampling activities will be conducted in accordance with guidelines outlined in EPA/ERT Sediment Sampling SOP #2016 (Attachment B).

4.3.3 Sample Handling and Shipment

Each of the sample bottles will be sealed and labeled according to the following protocol. Caps will be secured with custody seals. Bottle labels will contain all required information including site/project code and sample number, time and date of collection, analyses requested, and preservative used. Sealed bottles will be placed in large metal or plastic coolers, and padded with an absorbent material such as vermiculite. All packaging will conform to IATA Regulations for overnight carriers.

All sample documents will be affixed to the underside of each cooler lid. The lid will be sealed and affixed on at least two sides with custody seals so that any sign of tampering is easily visible.

4.4 Analytical Methods

Analytical methods to be utilized in the analyses of samples collected during this sampling event are detailed in Table 3.

4.5 Schedule of Activities

Proposed Start Date	Activity	End Date
April 29, 1997	Sediment Sampling	April 29, 1997

4.6 Disposal of PPE and Investigation-Derived Wastes

To the extent possible, all PPE and sampling materials will be decontaminated on site, double bagged and disposed of in an approved manner.

5.0 PROJECT ORGANIZATION AND RESPONSIBILITIES

The EPA OSC, Joseph Cosentino, will provide overall direction to the staff concerning project sampling needs, objectives, and schedule. The Project Manager (PM), Patrick Austin, will be the primary point of contact with the OSC. The PM is responsible for the development and completion of the Sampling QA/QC Plan, project team organization, and supervision of all project tasks, including reporting and deliverables. The Site QC Coordinator will be responsible for ensuring field adherence to the Sampling QA/QC Plan and recording of any deviations. The START Analytical Services Coordinator, Smita Sumbaly, will be the primary project team contact with the subcontracted laboratory.

START will arrange for the laboratory analyses. START personnel will ship or hand-deliver all samples to the appropriate laboratory. The raw analytical data from the laboratory will be provided to the START Analytical Services Group for data validation.

The following sampling personnel will work on this project:

<u>Personnel</u>	<u>Responsibility</u>
Patrick A. Austin	Field Coordinator/Project Manager/Sampling
Christoph Stannik	Sampling/Site QA/QC

The following laboratory will provide the following analyses:

<u>Lab Name/Location</u>	<u>Sample Type</u>	<u>Parameters</u>
To be determined	Sediment	Full TCL, TAL Metals and PCDD/PCDF

A standard turnaround time of two weeks for verbal and three weeks for written results will be requested.

6.0 QA REQUIREMENTS

The following requirements apply to the respective QA objectives and parameters identified in Section 3.0. The QA Protocols for a Level 2 QA objective sampling event are applicable to all sample matrices and include:

1. Sample documentation in the form of field logbooks, appropriate field data sheets, and chain of custody records (chain of custody records are optional for field screening locations);
2. Calibration of all monitoring and/or field-portable analytical equipment prior to

collection and analyses of samples with results and/or performance check procedures/methods summarized and documented in a field, and/or instrument log notebook;

3. Field or laboratory determined method detection limits (MDLs) will be recorded along with corresponding analytical sample results, where appropriate;
4. Analytical holding times as determined from the time of sample collection through analysis. These will be documented in the field logbook or by the laboratory in the final data deliverable package;
5. Initial and continuous instrument calibration data;
6. QC blank results (rinsate, trip, method, preparation, instrument, etc.), as applicable;
7. Collection and analysis of blind field duplicate and MS/MSD QC samples to provide a quantitative measure of the analytical precision and accuracy, as applicable; and
8. Use of the following QC procedure for QC analyses and data validation:
 - Definitive identification - confirm the identification of analytes on 10% of the screened (field or laboratory) or 100% of the unscreened samples, via an EPA-approved method; provide documentation such as gas chromatograms, mass spectra, etc.

7.0 DELIVERABLES

The START PM, Patrick A. Austin, will maintain contact with the EPA OSC, Joseph Cosentino, to keep him informed about the technical and financial progress of this project. This communication will commence with the issuance of the work assignment and project scoping meeting. Activities under this project will be reported in status and trip reports and other deliverables (e.g., analytical reports, final reports) described herein. Activities will also be summarized in appropriate format for inclusion in monthly and annual reports.

The following deliverables will be provided under this project:

TRIP REPORT

A Trip Report will be prepared to provide a detailed accounting of what occurred during each sampling mobilization. The Trip Report will be prepared within one week of the last day of each sampling mobilization. Information will be provided on times of major events, dates, and personnel on site (including affiliations).

MAPS/FIGURES

Maps depicting site layout, contaminant source areas, and sample locations will be included in the Trip Report, as appropriate.

ANALYTICAL REPORT

An Analytical Report will be prepared for samples analyzed under this plan. Information regarding the analytical methods or procedures employed, sample results, QA/QC results, chain of custody documentation, laboratory correspondence, and raw data will be provided within this deliverable.

DATA REVIEW

A review of the data generated under this plan will be undertaken. The assessment of data acceptability or useability will be provided separately, or as part of the analytical report.

8.0 DATA VALIDATION

Data generated under this QA/QC Sampling Plan will be evaluated according to criteria contained in the Removal Program Data Validation Procedures that accompany OSWER Directive Number 9360.4-1.

Laboratory analytical results will be assessed by the data reviewer for compliance with required precision, accuracy, completeness, representativeness, and sensitivity.

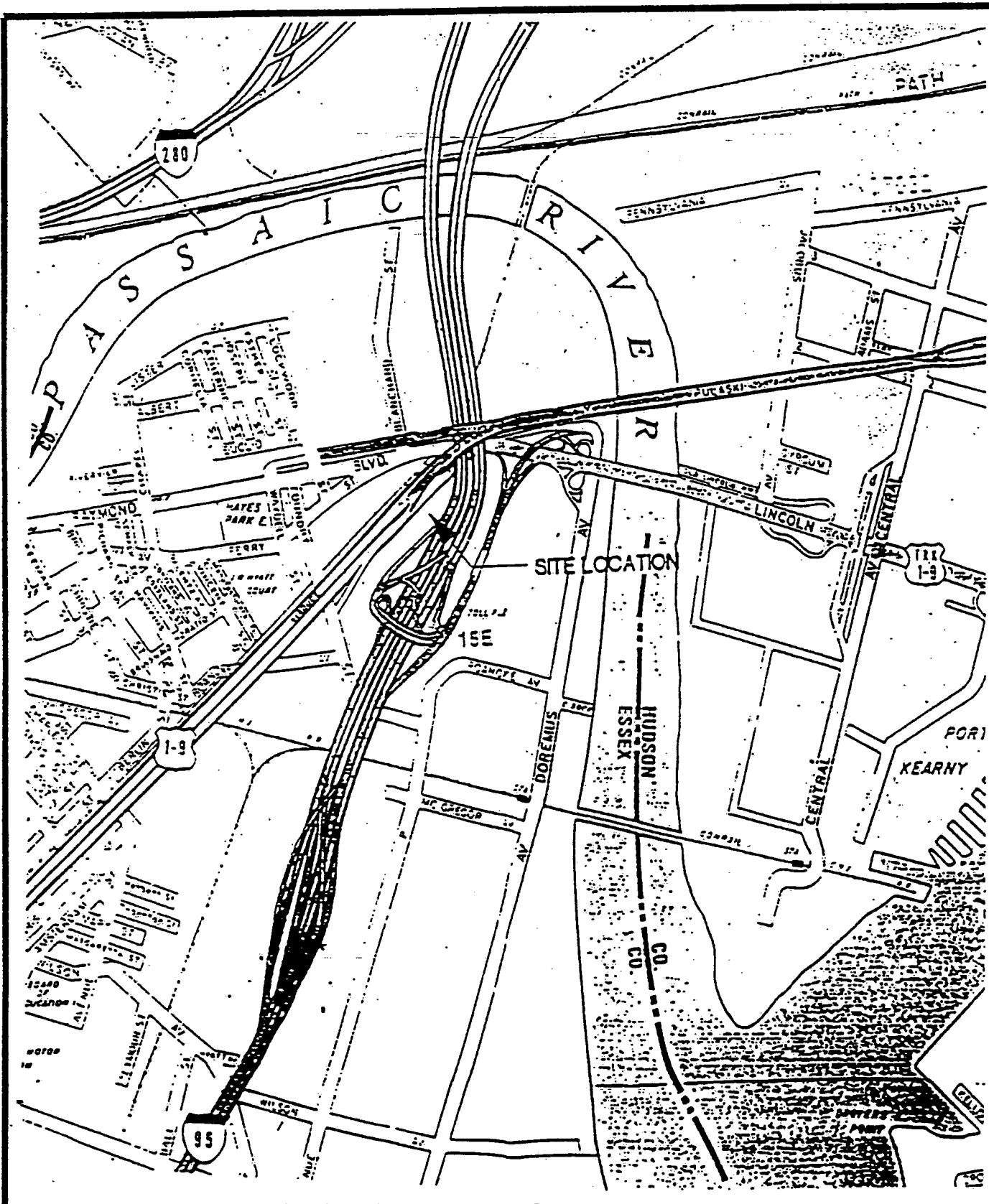
9.0 SYSTEM AUDIT

The Field QA/QC Officer will observe sampling operations and review subsequent analytical results to ensure compliance with the QA/QC requirements of the project/sampling event.

10.0 CORRECTIVE ACTION

All provisions will be taken in the field and laboratory to ensure that any problems that may develop will be dealt with as quickly as possible to ensure the continuity of the project/sampling events. Any deviations from this sampling plan will be noted in the final report.

ATTACHMENT A
SITE LOCATION MAP



Roy F. Weston, Inc.

FEDERAL PROGRAMS DIVISION
MANAGERS/DESIGNERS/CONSULTANTS

IN ASSOCIATION WITH RESOURCE APPLICATION, Inc.
C.C. JOHNSON & MALHOTRA, P.C., R.E. SARRIERA ASSOCIATES,
PRC ENVIRONMENTAL MANAGEMENT, AND GRB ENVIRONMENTAL SERVICES, INC.

EPA PM

J. Cosentino

START PM

P. Austin

Bayonne
Barrel & Drum
Bayonne, New Jersey

Figure 1:
Site Location Map

ATTACHMENT B

EPA/ERT SEDIMENT SAMPLING SOP #2016

3.0 SEDIMENT SAMPLING: SOP #2016

3.1 SCOPE AND APPLICATION

This Standard Operating Procedure (SOP) is applicable to the collection of representative sediment samples. Analysis of sediment may determine whether concentrations of specific contaminants exceed established threshold action levels, or if the concentrations present a risk to public health, welfare, or the environment.

The methodologies discussed in this procedure are applicable to the sampling of sediment in both flowing and standing water. They are generic in nature and may be modified in whole or part to meet the handling and analytical requirements of the contaminants of concern, as well as the constraints presented by the sampling area. However, if modifications occur, they should be documented in the site logbook or report summarizing field activities.

For the purposes of this procedure, sediments are those mineral and organic materials situated beneath an aqueous layer. The aqueous layer may be either static, as in lakes, ponds, or other impoundments or flowing, as in rivers and streams.

3.2 METHOD SUMMARY

Sediment samples may be recovered using a variety of methods and equipment, depending on the depth of the aqueous layer, the portion of the sediment profile required (surface versus subsurface), the type of sample required (disturbed versus undisturbed) and the sediment type.

Sediment is collected from beneath an aqueous layer either directly, using a hand-held device such as a shovel, trowel, or auger, or indirectly using a remotely activated device such as an Ekman or Ponar dredge. Following collection, the sediment is placed into a container constructed of inert material, homogenized, and transferred to the appropriate sample containers. The homogenization procedure should not be used if sample analysis includes volatile organics.

3.3 SAMPLE PRESERVATION, CONTAINERS, HANDLING, AND STORAGE

- Chemical preservation of solids is generally not recommended. cooling is usually the best approach, supplemented by the appropriate holding time.

- Wide-mouth glass containers with Teflon-lined caps are utilized for sediment samples. The sample volume is a function of the analytical requirements and will be specified in the work plan.
- Transfer sediment from the sample collection device to an appropriate sample container using a stainless steel or plastic lab spoon or equivalent. If composite samples are collected, place the sediment sample in a stainless steel, plastic or other appropriated composition (e.g.: Teflon) bucket, and mix thoroughly to obtain a homogenous sample representative of the entire sampling interval. Then place the sediment into labeled containers.
- Samples for volatile organic analysis must be collected directly from the bucket, before mixing the sample, to minimize loss due to volatilization of contaminants.
- All sampling devices should be decontaminated, then wrapped in aluminum foil. The sampler should remain in this wrapping until it is needed. Each sampler should be used for only one sample. Dedicated samplers for sediment samples may be impractical due to the large number of sediment samples which may be required and the cost of the sampler. In this case, samplers should be cleaned in the field using the decontamination procedure described in SOP #2006, Sampling Equipment Decontamination.

3.4 INTERFERENCES AND POTENTIAL PROBLEMS

Substrate particle size and organic content are directly related to water velocity and flow characteristics of a body of water. Contaminants are more likely to be concentrated in sediments typified by fine particle size and a high organic content. This type of sediment is most likely to be collected from depositional zones. In contrast, coarse sediments with low organic content do not typically concentrate pollutants and are found in erosional zones. The selection of a sampling location can, therefore, greatly influence the analytical results.

3.5 EQUIPMENT/APPARATUS

Equipment needed for collection of surface water samples includes:

- maps/plot plan
- safety equipment
- compass
- tape measure
- survey stakes, flags, or buoys and anchors
- camera and film
- stainless steel, plastic, or other appropriate composition bucket
- 4-oz., 8-oz., and on-quart, wide-mouth jars w/Teflon-lined lids
- Ziploc plastic bags
- logbook
- sample jar labels
- chain of custody forms, field data sheets
- cooler(s)
- ice
- decontamination supplies/equipment
- spade or shovel
- spatula
- scoop
- trowel
- bucket auger
- thin-walled auger
- extension rods
- T-handle

- sampling trier
- sediment coring device (tubes, points, drive, head, drop hammer, "eggshell" check valve devices, acetate cores)
- Ponar dredge
- Ekman dredge
- nylon rope

3.6 REAGENTS

Reagents are not used for preservation of sediment samples. Decontamination solutions are specified in SOP #2006, Sampling Equipment Decontamination.

3.7 PROCEDURES

3.7.1 Preparation

1. Determine the extent of the sampling effort, the sampling methods to be employed, and which equipment and supplies are needed.
2. Obtain necessary sampling and monitoring equipment.
3. Decontaminate or preclean equipment, and ensure that it is in working order.
4. Prepare scheduling and coordinate with staff, clients, and regulatory agency, if appropriate.
5. Perform a general site survey prior to site entry in accordance with the site-specific health and safety plan.
6. Use stakes, flags, or buoys to identify and mark all sampling locations. Specific site characteristics, including flow regime, basin morphometry, sediment characteristics, depth of overlying aqueous layer, and extent and nature of contaminant should be considered when selecting sample location. If required, the proposed locations may be adjusted based on site access, property boundaries, and surface obstructions.

3.7.2 Sampling Collection

Selection of a sampling device is most often contingent upon: (1) the depth of water at the sampling location, and (2) the physical characteristics of the medium to be sampled.

Sampling Surface Sediments with a trowel or Scoop From Beneath a Shallow Aqueous Layer

Collection of surface sediment from beneath a shallow aqueous layer can be accomplished with tools such as spades, shovels, and scoops. Surface material can be removed to the required depth; then a stainless steel or plastic scoop should be used to collect the sample.

This method can be used to collect consolidated sediments but is limited somewhat by the depth of the aqueous layer. Accurate, representative samples can be collected with this procedure depending on the care and precision demonstrated by the sample team member. A stainless steel or plastic scoop or lab spoon will suffice in most applications. Care should be exercised to avoid the use of devices plated with chrome or other materials. Plating is particularly common with garden tools.

Follow these procedures to collect sediment samples with a scoop or trowel

1. Using a precleaned stainless steel scoop or trowel, remove the desired thickness of sediment from the sampling area.
2. Transfer the sample into an appropriate sample or homogenization container.

Sampling Surface Sediments with a Thin-Wall Tube Auger From Beneath a Shallow Aqueous Layer

This system consists of an auger, a series of extension rods, and a "T" handle (see Figure 4, Appendix A). The auger is driven into the sediment and used to extract a core. A sample of the core is taken from the appropriate depth.

Use the following procedure to collect sediment samples with a thin-wall auger:

1. Insert the auger into the material to be sampled at a 0° to 45° angle from vertical. This orientation minimizes spillage of the sample from the sampler. Extraction of samples may require tilting of the sampler.
2. Rotate the auger once or twice to cut a core of material.
3. Slowly withdraw the auger, making sure that the slot is facing upward.
4. An acetate core may be inserted into the auger prior to sampling, if characteristics of the sediments or body of water warrant. By using this technique, an intact core can be extracted.
5. Transfer the sample into an appropriate sample or homogenization container.

Sampling Deep Sediments with Augers and Thin-Wall Tube Samplers From Beneath a Shallow Aqueous Layer

This system uses an auger, a series of extension rods, a "T" handle, and a thin-wall tube sampler (Figure 4, Appendix A). The auger bores a hole to a desired sampling depth and then is withdrawn. The auger tip is then replaced with a tube core sampler, lowered down the borehole, and driven into the sediment at the completion depth. The core is then withdrawn and the sample collected. This method can be used to collect consolidated sediments, but is somewhat limited by the depth of the aqueous layer.

Several augers are available which include bucket and posthole augers. Bucket augers are better for direct sample recovery, are fast, and provide a large volume of sample. Posthole augers have limited utility for sample collection as they are designed more for their ability to cut through fibrous, rooted, swampy areas.

Follow these procedures to collect sediment samples with a hand auger:

1. Attach the auger bit to a drill extension rod, then attach the "T" handle to the drill extension rod.
2. Clear the area to be sampled of any surface debris.
3. Begin augering, periodically removing any accumulated sediment from the auger bucket.
4. After reaching the desired depth, slowly and carefully remove the auger from boring. (When sampling directly from the auger, collect sample after the auger is removed from boring and proceed to Step 10.)

5. Remove auger tip from drill rods and replace with a precleaned thin-wall tube sampler. Install proper cutting tip.

6. Carefully lower tube sampler down borehole. Gradually force tube sampler into sediment. Care should be taken to avoid scraping the borehole sides. Also, avoid hammering of the drill rods to facilitate coring, since the vibrations may cause the boring walls to collapse.

7. Remove tube sampler and unscrew drill rods.

8. Remove cutting tip and remove core from device.

9. Discard top of core (approximately 1 inch), as this represents material collected by the tube sampler before penetration of the layer of concern.

10. Transfer sampler into an appropriate sample or homogenization container.

Sampling Surface Sediments From Beneath a Deep Aqueous Layer with an Ekman or Ponar Dredge

This technique consists of lowering a sampling device to the sediment by use of a rope, cable, or extended handle. The mechanism is triggered, and the device entraps sediment in spring-loaded jaws, or within lever-operated jaws.

Follow these procedure for collecting sediment with an Ekman dredge (Figure 5, Appendix A):

1. Thread a sturdy nylon or stainless steel cable through the bracket, or secure the extended handle to the bracket with machine bolts.

2. Attach springs to both sides. Arrange the Ekman dredge sampler so that the jaws are in the open position and trip cables are positioned over the release studs.

3. Lower the sampler to a point just above the sediment surface.

4. Drop the sampler sharply onto the sediment.

5. Trigger the jaw release mechanism by lowering a messenger down the line, or by depressing the button on the upper end of the extended handle.

6. Raise the sample and slowly decant any free liquid through the top of the sampler. Be careful to retain fine sediments.

7. Open the dredge and transfer the sediment into a stainless steel or plastic bucket. Continue to collect additional sediment until sufficient material has been secured. Thoroughly mix sediment to obtain a homogeneous sample, and then transfer to the appropriate sample container.

8. Samples for volatile organic analysis must be collected directly from the bucket before mixing the

sample to minimize volatilization of contaminants.

Follow these procedures for collecting sediment with a Ponar dredge (Figure 6, Appendix A):

1. Attach a sturdy nylon or steel cable to the hook provided on top of the dredge.

2. Arrange the Ponar dredge sampler in the open position, setting the trip bar so the sampler remains open when lifted from the top.

3. Slowly lower the sampler to a point just above the sediment.

4. Drop the sampler sharply into the sediment, then pull sharply up on the line, thus releasing the trip bar and closing the dredge.

5. Raise the sampler to the surface and slowly decant any free liquid through the screens on top of the dredge. Be careful to retain fine sediments.

6. Open the dredge and transfer the sediment to a stainless steel or plastic bucket. Continue to collect additional sediment until sufficient material has been gained. Thoroughly mix sediment to obtain a homogeneous sample, and then transfer to the appropriate sample container.

7. Samples for volatile organic analysis must be

collected directly from the bucket before mixing the sample to minimize volatilization of contaminants.

Sampling Subsurface Sediments From Beneath a Deep Aqueous Layer with a Sample Coring Device

Follow these procedures when using a sample coring device (Figure 7, Appendix A) to collect subsurface sediments. It consists of a coring device, handle, and acetate core utilized in the following procedure:

1. Assemble the coring device by inserting the acetate core into the sampling tube.
2. Insert the "eggshell" check valve mechanisms into the tip of the sampling tube with the convex surface positioned inside the acetate core.
3. Screw the coring point onto the tip of the sampling tube.
4. Screw the handle onto the upper end of the sampling tube and add extension rods as needed.
5. Place the sampler in a perpendicular position on the material to be sampled.
6. This sampler may be used with either a drive hammer for firm consolidated sediments, or a "T" handle for soft sediments. If the "T" handle is used, place downward pressure on the device until the desired

depth is reached. Rotate the sampler to shear off the core of the bottom, retrieve the device and proceed to Step 15.

7. If the drive hammer is selected, insert the tapered handle (drive head) of the drive hammer through the drive head,
8. With left hand holding the tube, drive the sampler into the material to the desired depth. Do not drive the tube further than the tip of the hammer's guide.
9. Record the length of the tube that penetrated the sample material, and the number of blows required to obtain this depth.
10. Remove the drive hammer and fit the keyhole-like opening on the flat side of the hammer onto the drive head. In this position, the hammer serves as a handle for the sampler.
11. Rotate the sampler at least two revolutions to shear off the sample at the bottom.
12. Lower the sampler handle (hammer) until it just clears the two ear-like protrusions on the drive head, and rotate about 90°.
13. Withdraw the sampler by pulling the handle (hammer) upwards and dislodging the hammer from the sampler.

14. Unscrew the coring point and remove the "eggshell" check valve.
15. Slide the acetate core out of the sampler tube. The acetate core may be capped at both ends. The sample may be used in this fashion, or the contents transferred to a stainless steel or plastic bucket and mixed thoroughly to obtain a homogeneous sample representative of the entire sampling interval.
16. Samples for volatile organic analysis must be collected directly from the bucket before mixing the sample to minimize volatilization of contaminants.

- All instrumentation must be operated in accordance with operating instructions as supplied by the manufacturer, unless otherwise specified in the work plan. Equipment checkout calibration activities must occur prior to sampling/operation and they must be documented.

3.10 DATA VALIDATION

This section is not applicable to this SOP.

3.11 HEALTH AND SAFETY

When working with potentially hazardous materials, follow U.S. EPA, OSHA and specific health and safety procedures. More specifically, when sampling sediment from bodies of water containing known or suspected hazardous substances, adequate precautions must be taken to ensure the sampler's safety. The team member collecting the sample should not get too close to the edge of the water, where bank failure may cause him or her to lose their balance. To prevent this, the person performing the sampling should be on a lifeline and be wearing adequate protective equipment. If sampling from a vessel is necessary, implement appropriate protective measures.

3.8 CALCULATIONS

This section is not applicable to this SOP.

3.9 QUALITY ASSURANCE/QUALITY CONTROL

There are no specific quality assurance activities which apply to the implementation of these procedures. However, the following QA/QC procedures apply:

- All data must be documented on field data sheets or within site logbooks.

ATTACHMENT C

EPA/ERT SAMPLING EQUIPMENT DECONTAMINATION SOP #2006

1.0 SAMPLING EQUIPMENT DECONTAMINATION: SOP #2006

1.1 SCOPE AND APPLICATION

This Standard Operating Procedure (SOP) describes methods used for preventing or reducing cross-contamination, and provides general guidelines for sampling equipment decontamination procedures at a hazardous waste site. Preventing or minimizing cross-contamination in sampled media and in samples is important for preventing the introduction of error into sampling results and for protecting the health and safety of site personnel.

Removing or neutralizing contaminants that have accumulated on sampling equipment ensures protection of personnel from permeating substances, reduces or eliminated transfer of contaminants to clean areas, prevents the mixing of incompatible substances, and minimizes the likelihood of sample cross-contamination.

1.2 METHOD SUMMARY

Contaminants can be physically removed from equipment, or deactivated by sterilization or disinfection. Gross contamination of equipment requires physical decontamination, including abrasive and non-abrasive methods. These include the use of brushes, air and wet blasting, and high-pressure water cleaning, followed by a wash/rinse process using appropriate cleaning solutions. Use of a solvent rinse is required when organic contamination is present.

1.3 SAMPLE PRESERVATION, CONTAINERS, HANDLING, AND STORAGE

This section is not applicable to this SOP.

1.4 INTERFERENCES AND POTENTIAL PROBLEMS

- The use of distilled/deionized water commonly available from commercial vendors may be acceptable for decontamination of sampling equipment provided that it has been verified by laboratory analysis to be analyte free.
- An untreated potable water supply is not an acceptable substitute for tap water. Tap water may be used from any municipal water treatment system for mixing of decontamination solutions.

- Acids and solvents utilized in the decontamination sequence pose the health and safety risks of inhalation or skin contact, and raise shipping concerns of permeation or degradation.
- The site work plan must address disposal of the spent decontamination solutions.
- Several procedures can be established to minimize contact with waste and the potential for contamination. For example:
 - Stress work practices that minimize contact with hazardous substances.
 - Use remote sampling, handling, and container-opening techniques when appropriate.
 - Cover monitoring and sampling equipment with protective material to minimize contamination.
 - Use disposable outer garments and disposable sampling equipment when appropriate.

1.5 EQUIPMENT/APPARATUS

- appropriate personal protective clothing
- non-phosphate detergent
- selected solvents
- long-handled brushes
- drop cloths/plastic sheeting
- trash container
- paper towels
- galvanized tubs or buckets
- tap water
- distilled/deionized water

- metal/plastic containers for storage and disposal contaminated wash solutions
- pressurized sprayers for tap and deionized/distilled water
- sprayers for solvents
- trash bags
- aluminum foil
- safety glasses or splash shield
- emergency eyewash bottle

1.6 REAGENTS

There are no reagents used in this procedure aside from the actual decontamination solutions and solvents. In general, the following solvents are utilized for decontamination purposes:

- 10% nitric acid ⁽¹⁾
- acetone (pesticide grade) ⁽²⁾
- hexane (pesticide grade) ⁽²⁾
- methanol

⁽¹⁾ Only if sample is to be analyzed for trace metals.

⁽²⁾ Only if sample is to be analyzed for organics.

1.7 PROCEDURES

As part of the health and safety plan, develop and set up a decontamination plan before any personnel or equipment enter the areas of potential exposure. The equipment decontamination plan should include:

- the number, location, and layout of decontamination stations
- which decontamination apparatus is needed
- the appropriate decontamination methods
- methods for disposal of contaminated clothing, apparatus, and solutions

1.7.1 Decontamination Methods

All personnel, samples, and equipment leaving the contaminated area of a site must be decontaminated. Various decontamination methods will either physically remove contaminants, inactivate contaminants by disinfection or sterilization, or do both.

In many cases, gross contamination can be removed by physical means. The physical decontamination techniques appropriate for equipment decontamination can be grouped into two categories: abrasive methods and non-abrasive methods.

Abrasive Cleaning Methods

Abrasive cleaning methods work by rubbing and wearing away the top layer of the surface containing the contaminant. The following methods are available:

- **Mechanical:** Mechanical cleaning method use brushes of metal or nylon. The amount and type of contaminants removed will vary with the hardness of bristles, length of brushing time, and degree of brush contact.
- **Air Blasting:** Air blasting is used for cleaning large equipment, such as bulldozers, drilling rigs or auger bits. The equipment used in air blast cleaning employs compressed air to force abrasive material through a nozzle at high velocities. The distance between the nozzle and the surface cleaned, as well as the pressure of air, the time of application, and the angle at which the abrasive strikes the surface, determines cleaning efficiency. Air blasting has several disadvantages: it is unable to control the amount of material removed, it can aerate contaminants, and it generates large amounts of waste.
- **Wet Blasting:** Wet blast cleaning, also used to clean large equipment, involves use of a suspended fine abrasive delivered by compressed air to the contaminated area. The amount of materials removed can be carefully controlled by using very fine abrasives. This method generates a large amount of waste.

Non-Abrasive Cleaning Methods

Non-abrasive cleaning methods work by forcing the contaminant off of a surface with pressure. In general, less of the equipment surface is removed

using non-abrasive methods. The following non-abrasive methods are available:

- **High-Pressure Water:** This method consists of a high-pressure pump, an operator-controlled directional nozzle, and a high-pressure hose. Operating pressure usually ranges from 340 to 680 atmospheres (atm) which related to flow rate of 20 to 140 liters per minute.
- **Ultra-High-Pressure Water:** This system produces a pressurized water jet (from 1,000 to 4,000 atm). the ultra-high-pressure spray removes tightly-adhered surface film. The water velocity ranges from 500 m/sec (1,000 atm) to 900 m/sec (4,000 atm). Additives can enhance the method. this method is not applicable for hand-held sampling equipment.

Disinfection/Rinse Methods

- **Disinfection:** Disinfectants are a practical means of inactivating infectious agents.
- **Sterilization:** Standard sterilization methods involve heating the equipment. Sterilization is impractical for large equipment.
- **Rinsing:** Rinsing removes contaminants through dilution, physical attraction, and solubilization.

1.7.2 Field Sampling Equipment Cleaning Procedures

Solvent rinses are not necessarily required when organics are not a contaminant of concern and may be eliminated from the sequence specified below. Similarly, an acid rinse is not required if analysis does not include inorganics.

1. Where applicable, follow physical removal procedures specified in section 1.7.1.
2. Wash equipment with a non-phosphate detergent solution.

3. Rinse with tap water.
4. Rinse with distilled/deionized water.
5. Rinse with 10% nitric acid if the sample will be analyzed for trace metals.
6. Rinse with distilled/deionized water.
7. Use a solvent rinse (pesticide grade) if the sample will be analyzed for organics.
8. Air dry the equipment completely.
9. Rinse again with distilled/deionized water.

Selection of the solvent for use in the decontamination process is based on the contaminant present at the site. Use of a solvent is required when organic contamination is present on-site. Typical solvents used for removal of organic contaminants include acetone, hexane, or water. An acid rinse step is required if metals are present on site. If a particular contaminant fraction is not present at the site, the nine-step decontamination procedure listed above may be modified for site specificity. The decontamination solvent used should not be among the contaminants of concern at the site.

Table 1 lists solvent rinses which may be required for elimination of particular chemicals. After each solvent rinse, the equipment should be air dried and rinsed with distilled/deionized water.

Sampling equipment that required the use of plastic tubing should be disassembled and the tubing replaced with clean tubing, before commencement of sampling and between sampling locations.

1.8 CALCULATIONS

This section is not applicable to this SOP.

1.9 QUALITY ASSURANCE/QUALITY CONTROL

One type of quality control sample specific to the field decontamination process is the rinsate blank. The rinsate blank provides information on the effectiveness of the decontamination process employed in the field. When used in conjunction with field blanks and trip blanks, a rinsate blank can detect contamination during sample handling, storage and sample transportation to the laboratory.

1.10 DATA VALIDATION

This section is not applicable to this SOP.

1.11 HEALTH AND SAFETY

When working with potentially hazardous materials, follow U.S. EPA, OSHA and specific health and safety procedures.

Decontamination can pose hazards under certain circumstances even though performed to protect health and safety. Hazardous substances may be incompatible with decontamination methods. For example, the decontamination solution or solvent may react with contaminants to produce heat, explosion, or toxic products. Decontamination methods may be incompatible with clothing or equipment; some solvents can permeate or degrade protective clothing. Also, decontamination solution and solvents may pose a direct health hazard to workers through inhalation or skin contact, or if they combust.

The decontamination solutions and solvents must be determined to be compatible before use. Any method that permeates, degrades, or damages personal protective equipment should not be used. If decontamination methods pose a direct health hazard, measures should be taken to protect personnel or the methods should be modified to eliminate the hazard.

Table 1: Recommended Solvent Rinse for Soluble Contaminants

SOLVENT	SOLUBLE CONTAMINANTS
Water	<ul style="list-style-type: none"> • Low-chain hydrocarbons • Inorganic compounds • Salts • Some organic acids and other polar compounds
Dilute Acids	<ul style="list-style-type: none"> • Basic (caustic) compounds • Amines • Hydrazines
Dilute Bases—for example, detergent and soap	<ul style="list-style-type: none"> • Metals • Acidic compounds • Phenol • Thiols • Some nitro and sulfonic compounds
Organic Solvents ⁽¹⁾ - for example, alcohols, ethers, ketones, aromatics, straight-chain alkanes (e.g., hexane), and common petroleum products (e.g., fuel, oil, kerosene)	<ul style="list-style-type: none"> • Nonpolar compounds (e.g., some organic compounds)

⁽¹⁾ WARNING: Some organic solvents can permeate and/or degrade protective clothing.

A rinsate blank consists of a sample of analyte-free (i.e., deionized) water which is passed over and through a field decontaminated sampling device and placed in a clean sample container.

Rinsate blanks should be run for all parameters of interest at a rate of 1 per 20 for each parameter, even if samples are not shipped that day. Rinsate blanks are not required if dedicated sampling equipment is used.